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Test and Evaluation Plan for the Manual Domestic Passive Profiling System (MDPPS)

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February 1994

Project Plan

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16. Abstract

This document is the Test and Evaluation Plan (T&E) for a prototype system to manually passively profile passengers on domestic flights. The goal was to develop a "profile" to identify domestic passengers judged not to represent a terrorist threat.

The initial profiling data elements were identified through contributions from Federal Aviation Administration/Assistant Administration for Civil Aviation Security (FAA/ACS) personnel and Northwest Airlines Security personnel. These elements were evaluated and refined at a Subject-Matter Expert (SME) workshop using Federal Bureau of Investigation (FBI), Immigration and Naturalization Service (INS), Customs, airline security personnel, and FAA personnel. A worksheet and scoring procedures for using the profiling elements were developed so that domestic passengers could be profiled by airline or other personnel.

A field test of the feasibility of the Manual Domestic Passive Profiling (MDPP) worksheet was conducted at the Milwaukee Airport. The results will be analyzed and become part of a later document.

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PREFACE

This document conta[i]... a compilation of data collected at Northwest Airlines terminal, General Mitchell International Airport ...vaukee, Wisconsin from February 22-24, 1994. The study was conducted in support of the Aviat... ...Administration Technical Center (FAATC), Atlantic City International Airport, New Jersey. The key Federal Aviation Administration (FAA) personnel supporting this testing effort were James L. Fobes, Ph.D., and Ronald J. Lafaro, Ph.D., both Engineering Research Psychologists of the Aviation Security Research and Development Service.

Galaxy Scientific Corporation (GSC) prepared this document under Contact number DTFA03-92-C-00035 with the FAATC. The Program Manager at Galaxy Scientific Corporation is William Hassler, Jr. The authors of this document are Jack Berkowitz, and Nancy Dolan.

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TABLE OF CONTENTS

APPENDICES

LIST OF TABLES

LIST OF ABBREVIATIONS AND SYMBOLS

ACI	Office of Civil Aviation Security Intelligence
ACP	Office of Civil Aviation Security Policy and Planning
ACS	Assistant Administration for Civil Aviation Security
APS	Automated Profiling System
COIC	Critical Operational Issues and Criteria
COTR	Contracting Officer's Technical Representative
CRS	Customer Reservation System
EDS	Explosive Detection Systems
FAA	Federal Aviation Administration
FBI	Federal Bureau of Investigation
GFI	Government Furnished Information
GSC	Galaxy Scientific Corporation
IAW	in accordance with
INS	Immigration and Naturalization Service
IOT&E	Initial Operational Test and Evaluation
MDPPS	Manual Domestic Passive Profiling System
MNS	Mission Need Statement
MOP	Measures of Performance
OT&E	Operational Test and Evaluation
PNR	Passenger Name Record
POI	Program of Instruction
RAPS	Risk Assessment Profile System
RPI	Research Project Initiative
SME	Subject-Matter Expert
T&E	Test and Evaluation
TEP	Test and Evaluation Plan
TER	Draft Test and Evaluation Report

1.   INTRODUCTION.

1.1   BACKGROUND.

     a.   An increase in threat conditions could result in a requirement for additional security precautions such as a positive passenger-bag match or x-ray inspection of all baggage. These precautions are resource intensive; however, their cost could be substantially reduced if the number of passengers needing special security measures could be minimized. This could potentially be accomplished by applying a passenger "profile" to identify domestic travelers thought not to represent a terrorist threat.

     b.   Profiles exist for detecting potential hijackers as well as terrorists on international flights. International profiling includes the Risk Assessment Profile System (RAPS) and Northwest Airlines has an experimental version of an Automated Profiling System (APS) in development for international passengers. The approach being taken for domestic passengers is to clear those judged not to be a threat as opposed to identifying threat individuals or "selectees."

     c.   The Office of Civil Aviation Security Policy and Planning (ACP) and Office of Civil Aviation Security Intelligence (ACI) Federal Aviation Administration (FAA) headquarters elements of Assistant Administration for Civil Aviation Security (ACS) require the design and feasibility analysis of a method for manually profiling domestic passengers. The present effort focuses on profiling which is passive, meaning that passengers are not directly queried. The anticipated technique will feature information contained in the Customer Reservation System (CRS) as well as any other relevant information readily available to the profiling airline agent. Scoring or profiling will consist of a mathematical score resulting from analysis of the combined data elements and their individual weighting factors.

     d.   The focus will be on using the profile score to eliminate low-risk passengers from additional special scrutiny (e.g., baggage matching, extensive baggage inspection). An automated version of the profiling procedure developed is anticipated for future development.

     e.   This research is conducted by the Aviation Security Human Factors Program under Research Project Initiative (RPI) #129 in support of Mission Need Statement (MNS) #163.

1.2   SYSTEM DESCRIPTION.

The Manual Domestic Passive Profiling System (MDPPS) being evaluated emphasizes input data from Northwest's Passenger Name Record (PNR). This reservation system is also used by Delta and TWA. Data will be entered on a paper and pencil instrument (evaluation/rating sheet) to be evaluated by the specified methodology developed. The outcome will be a MDPPS score which identifies passengers on a domestic flight who do not need additional special screening. Those not eliminated are candidates for a positive baggage match and/or interrogatory intervention. If a useful MDPPS is developed, future work will be needed to apply the technique to the CRS for the remaining major air carriers such as United (APOLLO CRS) and American (SABER CRS).

1.3   CRITICAL OPERATIONAL ISSUES AND CRITERIA (COIC).

Three critical operational issues will be tested and evaluated. Section 2 describes their scope, criteria, rationale, evaluation approach, analysis of Measures of Performance (MOP), and data presentation.

1.3.1   Issue 1.

Do airlines' CRS databases contain information elements appropriate for judging passengers not to be a threat on domestic flights?

1.3.2   Issue 2.

Does the profiling system eliminate most domestic passengers from requiring special security treatment?

1.3.3   Issue 3.

Does the domestic passenger profiling system require excessive resource requirements?

1.4   TEST AND EVALUATION MILESTONES.

Milestones have been established in table 1 to ensure orderly execution of the Test and Evaluation (T&E) process in terms of planning, programming and reporting.

TABLE 1. TEST AND EVALUATION MILESTONES

Event	Completion Schedule
Phase I:	
Task 1: Develop Test and Evaluation Plan (TEP)	21 Jan 94
Complete draft of Government Furnished Information (GFI) TEP format	
Incorporate FAA review and comments	
Task 2: Form Subject-Matter Expert (SME) panel	30 Jan 94
Develop FAA membership list for SME panel	
Finalize SME panel and workshop date(s)	
Task 3: Panel evaluation of Northwest information elements and rating factors for in MDPPS	14 Feb 94

TABLE 1. TEST AND EVALUATION MILESTONES (Continued)

Event	Completion Schedule
Obtain PNR information elements	
Develop SME workshop materials and protocols	
Conduct workshop to review GFI strawman profiling system and develop prototype MDPPS instrument	
Phase II:	
Task 4: Conduct Operational Test and Evaluation (OT&E)	25 Feb 94
Train Northwest employees to use the MDPPS	
Conduct pilot test	
Gather TEP-specified data at Milwaukee Airport/NW	
Task 5: Analyze data	28 Feb 94
Determine percentage of passengers cleared	
Determine time requirements for using MDPPS	
Estimate cost effectiveness	
Task 6: Draft Test and Evaluation Report (TER)	10 Mar 94
Complete draft of GFI TER format	
Incorporate FAA review and comments	
Task 7: Final TER	31 Mar 94

2. TEST AND EVALUATION STRATEGY.

2.1 OPERATIONAL EFFECTIVENESS.

The operational effectiveness of passive domestic profiling is addressed through critical operational issues on objective profiling criteria and percentage of passengers cleared.

2.1.1 Issue 1 - Profiling Criteria.

Do airlines' CRS databases contain information elements appropriate for identifying passengers judged not to be a threat on domestic flights?

2.1.1.1 Scope.

Airline reservations systems contain data fields for information such as mode of payment, routing, frequent flyer membership, etcetera. Table 2 presents the information from Northwest's PNR that will be given to a panel of SMEs. They will also be provided with a list of reservation information proposed by (ACI) for domestic profiling (table 3). The SMEs will evaluate information readily available to airline personnel and judge whether it can reasonably be expected to identify domestic passengers not needing special security measures.

2.1.1.2 Criteria.

    a. The SME panel (table 4) will recommend particular information items to be used as factors in the MDPPS job aid.

    b. The SME panel will recommend the weighting of information items to be used as factors in the MDPPS job aid.

    c. The SME panel will recommend an algorithm/decision rule for using the information items, plus any necessary factor weightings, for using the decision rule.

2.1.1.3 Rationale.

The use of an SME panel is essential to MDPPS because no objective method exists to determine and evaluate the validity of items us\ as factors in MDPPS's decision rule.

2.1.1.4 Evaluation Approach.

The SME panel will be selected and assembled to consensually evaluate CRS information and suggest how to use this information to identify passengers not needing special screening.

2.1.1.5 Analysis of MOPs and Data Presentations.

MOP 1. Consensual evaluation of the validity for each CRS element.

MOP 2. Consensual evaluation of any additional information readily available to the airline profiler.

TABLE 2. DATA AVAILABLE FROM NORTHWEST AIRLINES

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> FEDERAL AVIATION ADMINISTRATION
> 800 INDEPENDENCE AVENUE, SW
> WASF IGTON, DC 20591

TABLE 3. STRAWMAN DOMESTIC PROFILING DATA ELEMENTS

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> WASHINGTON, DC 20591

TABLE 4. SUBJECT-MATTER EXPERTS

Organization

AMERICAN AIRLINES SECURITY
American Airlines, MD-5555 HQs, 4333 Amon Carter,
Ft. Worth, TX 76155

CUSTOMS
Room 4417, US Customs Service, 1301 Constitution Ave,
NW Washington, DC 20229

FAA
ACI-200, FAA Headquarters, 800 Independence Ave, SW
Washington, DC 20591

FEDERAL BUREAU OF INVESTIGATION (FBI)
FBI Academy, Quantico, VA 22135

IMMIGRATION AND NATURALIZATION SERVICE (INS)
1212 Princess St., Alexandria, VA 22314

NORTHWEST AIRLINES SECURITY
Northwest Airlines, Dept A4420, 5101 Northwest Dr.
St. Paul, MN 55111

UNITED AIRLINES SECURITY
UAL EXOVS, POB 66100, Chicago, IL 60666

Falcilitators:

FAATC
Aviation Security Research and Development Service, Building 315, Atlantic City International
Airport, NJ 08405

GALAXY SCIENTIFIC CORPORATION
2500 English Creek Avenue, Building 11, Pleasantville, NJ 08232

MOP 3. Consensual evaluation of weighting factors for information elements.

MOP 4. Consensual evaluation of the decision rule for combining information elements.

MOP 5. Job aid worksheet for profilers.

2.1.1.6 Analysis Methodology and Data Presentations.

     a.   SME evaluations will be tabulated as shown in table 5.

     b.   Each evaluation will represent the mean score per information item.

     c.   Scoring algorithm(s) will be shown along with directions for using the decision aid.

     d.   All SME panel data will be word processed as an interim product (WP 5.0 or 5.1) in both hard copy and floppy disk.

2.1.1.7 Data Requirements.

     a.   SME validity judgements for CRS information elements.

     b.   SME evaluations of any additional data elements to be used.

     c.   SME factor weights.

     d.   SME evaluation of scoring algorithm.

     e.   Decision aid worksheet

2.1.2 Issue 2 - Percentage Eliminated.

Does the profiling system eliminate most passengers from requiring special security treatment?

2.1.2.1 Scope.

The aim of the MDPPS is to identify those passengers that do not require special security treatment. It is presumed that the great majority of passengers will fall into this category and the MDPPS should accordingly eliminate most passengers. The preliminary MDPPS developed will be field tested to determine if an acceptable percentage of passengers are eliminated from further special treatment.

2.1.2.2 Criterion.

None. This issue is investigative in nature.

TABLE 5. DATA ELEMENT EVALUATION

Profiling Element	Consensual Source	Consensual Validity	Weight

2.1.2.3 Rationale.

A study to determine the percentage of passengers eliminated from requiring additional special scrutiny is necessary to evaluate the practical effectiveness of the MDPPS. No basis exists for selecting minimal clearance rates.

2.1.2.4 Evaluation Approach.

A research team will develop a preliminary MDPPS and field test to provide information to ACS for their determination of whether the percentage of passengers eliminated is acceptable.

2.1.2.5 Analysis of MOPs and Data Presentation.

MOP 6. Number of domestic passengers profiled on various types of flights.

MOP 7. Number of domestic passengers cleared by MDPPS.

2.1.2.6 Analysis Methodology and Data Presentations.

a.   The total number of passengers eliminated from requiring additional special treatment will be examined as a proportion of the total number of passengers profiled.

b.   Data will be tabulated as shown in table 6.

2.1.2.7 Data Requirements.

a.   Number of passengers profiled.

b.   Number of passengers eliminated.

c.   Percentage of passengers cleared.

2.2 OPERATIONAL SUITABILITY.

Operational suitability will be evaluated by considering resource requirements.

TABLE 6. PASSENGER PROFILING

Total Number of Passengers Profiled	Total Number of Passengers Eliminated	Percentage of Passengers Eliminated

2.2.1 Issue 3 - Resource Requirements.

Does the domestic passenger profiling system require excessive resource requirements?

2.2.1.1 Scope.

The MDPPS is intended for potential implementation on all domestic flights. Airlines have limited financial and personnel resources and the MDPPS should not unduly impact their resources by requiring excessive monetary and/or personnel commitments.

2.2.1.2 Criterion.

None. This issue is investigative in nature.

2.2.1.3 Rationale.

MDPPS implementation will directly affect resource allocation within airlines. The field test and evaluation of the MDPPS provides an opportunity to collect data regarding anticipated resource requirements and expenditures involved in supporting the system.

2.2.1.4 Evaluation Approach.

A research team will collect data on the resource requirements for conducting objective MDPPS.

2.2.1.5 Analysis of MOPs and Data Presentation.

MOP 8. Profile resource requirements for CRS data.

2.2.1.6 Analysis Methodology and Data Presentations.

    a.   Resource requirements necessary to implement and support objective profiling will be determined.

    b.   Resource requirements will be tabulated as shown in table 7.

2.2.1.7 Data Requirements.

    a.   Training costs to prepare profiler.

b.   Labor cost for profiling.

c.   Miscellaneous equipment required.

2.3   DATA SOURCE MATRIX.

Table 8 shows the primary and secondary sources for all data elements to be collected.

2.3.1   Issue 1.

Data elements collected to determine if the airlines' CRS databases contain informati   t can be used to profile passengers will be primarily provided by the SME panel. The SME p   will evaluate information currently collected by airline personnel to determine whether it can reliably be used to identify domestic passengers not needing additional special security screening. Members of the panel will provide validity judgments for CRS information, recommendations of any additional information that could be used to profile passengers, and relative weighting for these profiling factors. In addition, the panel will discuss and come to a consensus on a scoring algorithm for the MDPPS.

TABLE 7. PROFILING RESOURCE REQUIREMENTS

Personnel

Trainers
Profilers

Equipment

MDPPS Instrument
Clipboards, Pen/Pencils, Calculators
Computer Terminals

TABLE 8. DATA SOURCE MATRIX

Data Element	SME	IOT&E	NW Airlines
Validity Judgements for Information Elements	P		
Additional Data Element	S		P
Factor Weights	P		

TABLE 8. DATA SOURCE MATRIX (Continued)

Data Element	SME	IOT&E	NW Airlines
Evaluation of Scoring Rule	P		
Number Profiled		P	
Number Cleared		P	
Percentage Cleared		P	
Training Costs		S	P
Labor Costs		S	P

Northwest will also provide data elements regarding Issue 1 along with critical profiling items (i.e., items that automatically clear or fail to clear).

2.3.2 Issue 2.

Data elements collected to determine if the MDPPS developed will eliminate most passengers from requiring additional special security treatment will be collected during Initial Operational Test and Evaluation (IOT&E). The percentage of passengers cleared will be obtained by dividing the number of passengers eliminated by the number of passengers profiled.

2.3.3 Issue 3.

Data elements to support the FAA's decision on whether the MDPPS requires excessive resource requirements will be collected from the airlines. The perceived, estimated, and actual time and activity commitments required to implement and maintain the system will be gathered and presented to the airline representatives. A cost-benefit analysis will be conducted between the test team and Northwest.

2.4 TEST APPROACH.

2.4.1 Test Scope.

The scope of this test includes those activities necessary to identify profiling criteria, create a manual profiling form, and conduct an operational test to determine the feasibility of the system.

2.4.2 Factors and Conditions.

Table 9 lists the factors and conditions, for potentially relevant variables including subject variables, and their control procedures.

2.4.3 Sample Size and Other Considerations.

The SME panel will consist of no more than ten individuals representing various government and airline agencies responsible for security, safety, and legal issues involving air travel, passenger safety, and anti-terrorism. Northwest will provide the necessary computer equipment to gather all CRS data and ticket lifts, and test personnel (Galaxy/Northwest) will perform the manual profiling. The focus of the effort is to get a percentage of "known" versus "unknown" passengers using the indicators identified by the SME panel. Passengers will be randomly selected for on-line profiling and entire flights will be profiled off-line. The total number of passengers profiled will be approximately 500.

2.5 EVALUATION DATABASE STRUCTURE.

2.5.1 Objective and Variable Data.

Table 5 shows the layout for data collected on profiling elements as well as their validity and weighting.

2.5.2 Profiling Data.

Table 10 shows the layout for data collected during IOT&E regarding passengers eliminated by the MDPPS.

2.5.3 Cost Data.

Table 11 shows the layout for data collected during the panel discussions, IOT&E, and ensuing discussions regarding the number of passengers eliminated by the MDPPS.

TABLE 9. FACTORS AND CONDITIONS

Factor	Control
Flight Factors	
Route	Systematic Variation
Time of day	Systematic Variation
Day of week	Uncontrolled
Time of year	Uncontrolled

TABLE 9. FACTORS AND CONDITIONS (Continued)

Factor	Control
Passenger Factors	
Age	Random Selection
Gender	Random Selection
Occupation	Random Selection
Travel purpose	Random Selection
Profiler Factors	
Years on job	Held Constant
Positions held	Held Constant
Training Courses/Education	Held Constant
Past job performance	Held Constant
Attitude toward job	Held Constant

TABLE 10. PASSENGER PROFILES DATABASE STRUCTURE

Flight Number

Route

Number Profiled

Number Cleared

Percentage Cleared

Average Profile Time

Standard Deviation

TABLE 11. RESOURCE REQUIREMENTS DATABASE STRUCTURE

Number Trained
Training Time
Training Cost
Number Profiling
Profiling Time
Profiling Cost

3.   TEST DESIGN.

3.1   TEST CONCEPT.

3.1.1   Introduction.

The MDPPS is a proposed tool for passive screening. Background data on passengers will be collected and assessed as to whether the passenger represents a "known" entity to the airline. Passengers who are determined to represent at least a minimally known entity will be passed through subsequent in-depth security checks. Passengers who do not meet the criteria will be subjected to special security checks, possibly including active profiling, passenger-bag matching, and/or baggage screening through Explosive Detection Systems (EDS).

3.1.2   Operational Context.

The MDPPS will perform its mission at airport check-in points. Eventual implementation of the MDPPS into the operations of the airport will be dictated by perceived threat levels across the aviation system.

3.1.3   Test Phases.

The IOT&E will be conducted in three phases: Phase 1 - Training, Phase 2 - Pilot Testing, and Phase 3 - Operational Testing.

3.1.4   Test Unit Configuration.

Test personnel will be Northwest and Galaxy Scientific employees. Other participants will be members of the SME panel identified in section 2.

3.1.5 Training Concept.

3.1.5.1 Training of Test Players.

Training for the SME panel personnel will be minimal and conducted by FAA and Galaxy Scientific personnel at the beginning of the SME panel working session. Training of Northwest profiling personnel will be conducted by Galaxy Scientific prior to the operational test phase. The training will consist of both classroom instruction and hands-on profiling trials. The training will be presented in accordance with (IAW) the Program of Instruction (POI) and lesson plans in appendix A.

3.1.5.2 Training of Test Organization.

Training of Galaxy Scientific and FAA test team personnel will occur prior to the operational test (appendix A).

3.1.6 Instrumentation.

The major instrumentation requirement is access to Northwest's computer terminals at the Milwaukee Airport and provisions for timing the profiler's duration to complete each profile.

3.1.7 Test Design Limitations.

The focus of the MDPPS project is to determine the feasibility of introducing the system into the operational environment. The scheme for introduction is to use the MDPPS tool at the point of passenger baggage checking. However, testing at this location would maximally disrupt the airline. Data will accordingly be collected at the gate agent location. Time requirements for real-time profiling at the gate will be extrapolated to the baggage check in site.

3.2 TEST DETAILS.

3.2.1 Issue 1.

Do airlines' CRS databases contain information elements appropriate for judging passengers not to be a threat on domestic flights?

3.2.1.1 General Methodology.

    a.   A SME Workshop will accomplish Task 3 of Phase 1. This workshop will be conducted in the Washington, D.C. area and use a Delphi technique for its methodology. The Delphi literature provides a complete blueprint for the construction and execution of the SME workshop and is abstracted in appendix C. The Contracting Officer's Technical Representative (COTR) will be the workshop facilitator.

    b.   A pre-workshop package (appendix D) will be sent to the SMEs approximately 14 days prior to convening the workshop. These materials will familiarize the SMEs with the objectives and requirements for the MDPPS. In addition, SMEs will be provided with listings of CRS data elements,

FAA sample profiling criteria, and other applicable data. SMEs will be asked to return portions of the pre-workshop package, prior to convening, for initial data analysis.

c.   Data collection will be conducted at Northwest in the Milwaukee, Wisconsin terminal. A random sample of passenger CRS records will be examined by ticket agents with real-time computer access to CRS data. These profiles will be done by viewing data elements during passenger interactions. The duration of this passenger profiling will be measured. In addition, entire flights will be profiled off-line by examining the CRS printout. This technique will also be timed.

3.2.1.2   Data Requirements.

Data requirements include the following:

a.   A complete listing of the data elements available in the Northwest's CRS computer system, including the PNR, the frequent flyer database, and the Baggage Tracking database.

b.   Candidate objective screening criteria obtained from SME panel recommendations.

c.   A weighting/decision system for the screening criteria will be derived from the SME panel.

d.   A random sample of CRS database records (PNR, Frequent Flyer, Baggage) for real-time and complete flight CRS records for off-line processing.

e.   Field observations of ticket agent-passenger interactions, including screen captures of computer data by the ticket agent and off-line evaluations of preprinted passenger data.

OTMOP 1. Consensual evaluation of the validity for each CRS element.

The SMEs will receive the available CRS data elements in the pre-meeting package mailed to each participant. Their review and ranking will be provided on attached forms and returned to the test team for initial analysis. The SME panel will then arrive at a consensus during its workshop on profile data elements, through the modified Delphi procedure.

OTMOP 2. Consensual evaluation of any additional information readily available to the airline profiler.

The SMEs will suggest additional data elements to be included in the passenger profile through the pre-meeting responses and the modified Delphi procedure at the meeting.

OTMOP 3. Consensual evaluation of weighting factors for information elements.

The SMEs will provide the importance of weighting data elements through the modified Delphi technique utilized at the SME meeting.

<u>OTMOP 4. Consensual evaluation of the decision rule for combining information elements.</u>

The SME panel will formulate a decision rule for combining the profile data elements into a tool to screen passengers. The concept for the decision rule is to provide a score for each passenger based on the final set of data elements chosen from the CRS databases and the weights derived in OTMOP 3. Passengers achieving a minimum score would be passed on in the security system without further <u>special</u> security efforts. The formulation of the decision rule will be elicited during the SME panel meeting using the modified Delphi technique.

<u>OTMOP 5. Job aid worksheet for profilers.</u>

Based on the recommendations of the SME panel for data elements, relative weightings, and the decision rule, a job aid worksheet will be constructed. This worksheet will provide the tool to perform the manual profiling to be tested for Issues 2 and 3. The construction of the job aid worksheet will be performed by the Galaxy Scientific test team. Acceptance of the job aid worksheet will be by consensus of the FAA monitors and the Northwest corporate security personnel.

3.2.2 Issue 2.

Does the profiling system eliminate most passengers from requiring special security treatment?

3.2.2.1 General Methodology.

      a. The CRS and ticket lift data will be gathered at Northwest's Milwaukee terminal and manual profiling performed using a combination of Northwest ticket agents and Galaxy Scientific test team members.

      b. Historical terrorist or threat profiles will be inserted into two typical flights to determine if the threat subjects are passed through the manual profiling system.

3.2.2.2 General Data Requirements.

Data requirements include the following:

      a. CRS and ticket lift data for a total of approximately 500 randomly selected passengers and entire flights at the Milwaukee airport.

      b. Completed job aid worksheets.

      c. Historical terrorist or threat profiles from the University of Louisville (if available in time).

<u>OTMOP 6. Number of domestic passengers profiled on various types of flights.</u>

Manual on-line profiling will be conducted on a random selection of passengers from numerous Northwest. Some flights will have all passengers profiled off-line.

OTMOP 7. Number of domestic passengers cleared by MDPPS.

The cleared and not-cleared rates will be determined. Passengers not-cleared will be categorized as due to insufficient information available in the file or as a failure to clear on merit.

3.2.3 Issue 3.

Does the domestic passenger profiling system require excessive resource requirements?

3.2.3.1 General Methodology.

a. Collect cost estimates, from Northwest auditors and security personnel, using the data collected in Issue 2.

b. Perform a cost-benefit analysis using the provided cost estimates.

3.2.3.2 General Data Requirements.

Data requirements include the following:

a. Profiling training times derived in Issue 2.

b. Profiling execution times per passenger and per flight derived in Issue 2.

c. Northwest's cost estimates for personnel, training, and resource requirements based on the data in a and b.

OTMOP 8. Profile resource requirements for CRS data.

Using the time to profile and training data collected in Issue 1, Northwest will provide additional staffing estimates. Included in these estimates will be items concerning additional airline profilers, as well as indirect training personnel and administrative support. A cost-benefit analysis will be conducted using the Northwest's estimates on direct and indirect costs, time required, and percentage of passengers cleared.

APPENDIX A

TRAINING CONCEPT

1. SME PANEL TRAINING.

Dr. Lofaro will provide the SME panel with approximately 45 minutes to one hour of instruction on the following:

      a.   group processes and products

      b.   consensus

      c.   "group think."

Included in this training will be:

      a.   a division of the workshop participants into two groups

      b.   an examination and discussion of the workshop objectives

      c.   an exposition of the workshop methodology

      d.   an examination of the worksheet results.

2. GALAXY SCIENTIFIC PERSONNEL TRAINING.

Northwest personnel will train Galaxy Scientific personnel on the meaning of the data elements in the PNR and navigation through the PNR database. An exercise will be conducted to permit Galaxy personnel to practice and become familiar with the system.

3. NORTHWEST AIRLINES TRAINING.

Galaxy Scientific personnel will brief Northwest ticket and/or gate agents about the MDPPS project. Following this, Galaxy Scientific and Northwest personnel will provide training on the use of the MDPPS instrument, the meaning of the data elements in the PNR, and navigation through the PNR database. An exercise will be conducted to permit North west's agents to practice and become familiar with the MDPPS instrument and the PNR system.

This training will be interactive, with suggestions from the Northwest's agents being discussed and the procedures modified appropriately.

TEST AND EVALUATION REPORT (TER)

FOR THE

MANUAL DOMESTIC PASSIVE PROFILING SYSTEM (MDPPS)

INITIAL OPERATIONAL TEST AND EVALUATION (IOT&E)

HUMAN FACTORS PROGRAM
AVIATION SECURITY R&D SERVICE

FAA TECHNICAL CENTER
ACA-400, BUILDING 315
ATLANTIC CITY INT'L AIRPORT, NJ 08405
TABLE OF CONTENTS

4   OVERALL CONCLUSIONS AND RECOMMENDATIONS

APPENDICES

Illustrations

Tables

APPENDIX C

THE DELPHI TECHNIQUE

Delphi techniques have become common methodologies for eliciting group analyses, expert opinions, and evaluations on a variety of topics. In general, standard Delphi techniques include anonymity of respondent, multiple iterations, convergence of the distribution of answers, and a statistical group response (e.g., median and interquartile range) preserving intact a distribution that still may remain wide (Judd, 1972). Lofaro developed modifications for small-group Delphi processes and facilitated this paradigm in FAA sponsored, contractor delivered workshops (aircrew training and assessment; aeronautical decision making; ATCS selection). As a result of these Delphi workshops, traditional Delphi processes were modified into a new paradigm for small-scale Delphi projects. The paradigm consists of the following (Lofaro, 1992):

      a.   Formal instruction in group processes, group dynamics, and methods of consensus. This includes guided exercises in group consensus followed by evaluation and critique of the group techniques by group members and the facilitator.

      b.   The use of an iterative, step-wise process to achieve the Delphi objectives. This process is:

          1.   Anonymous individual ratings

          2.   Sub-group discussions

          3.   Iterated individual ratings

          4.   Sub-group discussions and consensual ratings (possible iterations)

          5.   Intact group discussions, with possible iterated ratings, to achieve a final, group consensus on the ratings.

      c.   The use of a procedure in which the database for each step in an objective evolves from the preceding steps. This is done through computer analyses and reprinting the previous steps with the new data incorporated. The delay that occurs between iterations, while the data analyses are run and new worksheets are printed, is used to allow participants to proceed to another objective or task. This work schema also precludes, to some extent, the "let's get it done" syndrome, which often develops when the same data are iterated and reiterated.

REFERENCES.

1.   Lofaro, R.J. A small group delphi paradigm. *Human Factors Society Bulletin*, 1992, 35 (2) 1-4.

2.   Judd, R.C. Use of Delphi methods in higher education. *Technological forecasting and Social Change*, 1972, 4, 173-186.

APPENDIX D

SME PRE-WORKSHOP PACKAGE

MANUAL DOMESTIC PASSIVE PROFILING SYSTEM (MDPPS)

SUBJECT-MATTER EXPERT
PRE-WORKSHOP PACKAGE

Conducted by:
Aviation Security Human Factors Program
Aviation Security R&D Service
Federal Aviation Administration Technical Center

at:
Galaxy Scientific Corporation
4900 Seminary Road, Suite 530
Alexandria, VA 22311

February 14, 1994

TABLE OF CONTENTS

INTRODUCTION

Terrorists are expected to go out of their way to remain anonymous and our approach to passenger profiling accordingly emphasizes "knowing" the passenger. Airlines have travel information for each passenger that varies qualitatively and quantitatively. We are asking the SMEs to help develop a profiling procedure which uses critical variables and indicates whether enough is known about the traveler. "Known" passengers are then cleared from special security provisions. This approach contrasts with one attempting to identify threat individuals.

To help us determine the appropriate objective data elements and weighting criteria, we have invited several individuals from a number of organizations concerned with security. Representatives from the Federal Bureau of Investigations (FBI), the U.S. Customs Service, the Immigration and Naturalization Service (INS), and several airline security divisions are participating in the workshop.

A modification of a measurement method known as the Delphi technique will be used to collect data during the SME workshop. In this data collection technique, subject-matter experts provide information *individually* prior to attending a group meeting. Each expert's responses are analyzed and then averaged by the monitoring team. The compiled information is then presented to the experts at a group meeting, or workshop, and further discussed to clarify the information and provide group consensus.

To make the most efficient use of our one-day workshop time, we are asking you to review the enclosed information and complete the worksheets. We request, if possible, that you use the enclosed pre-paid envelope to mail us the completed worksheets no later than February 8, 1994. This way we can compile the individual data prior to the meeting, and thus make the best use of the workshop time.

The Objectives and Worksheets sections of this briefing describe in greater detail the objectives of the panel discussions and the activities we are asking you to perform both prior to arriving and during the workshop.

AGENDA

Introductions 8:00 - 8:30

Brief Discussion and Explanation of Objectives and Methodology

Discussion for Objective 1

BREAK

Summary of Conclusions from Discussion for Objective 1

LUNCH   12:00 - 1:00

Discussion for Objective 2

BREAK

Summary of Conclusions from Discussion for Objective 2

Workshop Conclusions

Final Remarks   4:00

LIST OF PARTICIPATING ORGANIZATIONS

SUBJECT-MATTER EXPERTS

FBI Academy
Quantico, VA 22135

United Airlines
UAL, EXOVS
POB 66100
Chicago, IL 60666

Immigration and Naturalization Service
1212 Princess St.
Alexandria, VA 22314

Northwest Airlines
Dept. A4420
5101 Northwest Dr.
St. Paul, MN 55111

American Airlines
MD-5555 HQs
4333 Amon Carter
Ft. Worth, TX 76155

FAA Headquarters, ACI-200
800 Independence Ave., SW
Washington, DC 20591

U.S. Customs Service
Room 4413
1301 Constitution Ave., NW
Washington, DC 20229

PANEL FACILITATORS

Aviation Security R&D Service
FAA Technical Center
Atlantic City International Airport, NJ 08405

Galaxy Scientific Corporation
2500 English Creek Ave., Building 11
Pleasantville, NJ 08232

OBJECTIVES

OBJECTIVE 1

Identify objective data elements for passenger profiling.

A. *Identify those data elements currently available to airline personnel that are helpful in passenger profiling.*

Most major airlines use a computer based passenger reservation system. These systems collect information about a passenger and their flight activities. It is thought that the information collected by such systems may be used to determine that a potential passenger does not require additional security attention. The SMEs will review a list of this information and determine which elements, if any, are appropriate for passenger profiling, and rate their criticality in determining a non-threat passenger. A worksheet for this objective is provided.

B. *Identify additional data elements that should be included in a passenger profiling system.*

Although the airlines data collection systems record a great deal of information about a passenger, not all critical factors will be included. The SMEs will be asked for recommendations on additional data elements that should be included in passenger profiling, but are not currently collected by the airlines. A worksheet for this objective is provided.

OBJECTIVE 2

Determine a weighting mechanism and decision rule for the objective data elements identified as necessary for passenger profiling.

Each piece of information collected about a potential passenger does not have the same degree of importance in determining whether or not a passenger requires additional special security screening. For example, frequent flyers or travel companions may be seen as more indicative of a non-threat potential than city of origin and method of payment.

To determine an appropriate weight for each identified data element, we will ask the SMEs to achieve a consensus on a weighting mechanism and decision tool. The goal of the MDPPS is to provide each passenger with a "score" that will enable a definitive decision to be made as to the necessity of requiring additional special security screening. The decision tool for the MDPPS is a direct result of the weighting mechanism chosen. The scoring algorithm is dependent on the type of numerical data supplied by the profiling system. As such, these two items, the weighting mechanism and the decision tool, will be developed in tandem. Once the weighting mechanism and decision tool has been agreed upon, it will be applied to each of the identified objective data elements. No worksheet for this objective is provided, but please put thought to this issue and come prepared for discussion.

WORKSHEETS

WORKSHEET 1 - *Objective 1*

A. *Identify those data elements currently available that are helpful in passenger profiling.*

Worksheet 1 provides a list of the type of information collected by currently used passenger reservation or potential profiling systems. Using the criticality rating scale provided, please rate all items as to their value in passenger profiling.

WORKSHEET REMOVED FROM PUBLICATION

To obtain a copy of the worksheet, submit a written request for the worksheet, citing this document and reason for the request to:

THE ASSISTANT ADMINISTRATOR FOR CIVIL AVIATION SECURITY, ACS-1
FEDERAL AVIATION ADMINISTRATION
800 INDEPENDENCE AVENUE, SW
WASHINGTON, DC 20591

WORKSHEET 2 - *Objective 1*

B. *Identify additional data elements that should be included in a passenger profiling system.*

Please indicate any additional data elements you feel should be included in a passenger profiling system.

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ADDITIONAL DATA ELEMENTS
_____      _____

_____      _____

_____      _____

_____      _____

_____      _____

_____      _____

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